REMARKS

This application has been carefully studied and amended in view of the Office Action dated November 14, 2006. The undersigned attorney wishes to thank Examiner Cooley for the courtesies and suggestions made during the course of a personal interview on February 6, 2007. The following remarks incorporate matters discussed during the interview.

Figure 4B has been added to illustrate the subject matter of claim 11. In that regard, Figure 4B differs from, for example, Figure 4A with respect to Figure 4A illustrating the shaft 1 to contain a channel 1k while Figure 4B shows the shaft 1 to have a smooth surface.

The different views which were not previously separately numbered are now consecutively numbered. In addition, Figures 3 and 5 now include reference characters and lead lines. The various reference characters previously referred to in the Specification, but not found in the drawings have been deleted from the Specification.

This amendment includes a substitute Specification which does not contain new matter. Attached is a marked copy of the prior Specification showing by underlining and by brackets the changes from the prior Specification to the substitute Specification. In the substitute Specification the matters raised in paragraphs 7-9 have been addressed.

Claim 14 has been amended so that it now is dependent on claim 10.

Claim 13 has been amended to recite by a Markush grouping the types of adjacent devices to which the mixing device can be connected. Support for this amendment to claim 13 is found at page 4, line 39 to page 5, line 4 which is now in page 5, line 44 to page 6, line 10 of the substitute Specification.

Reconsideration is respectfully requested of the rejection of claims 10, 11 and 13-16 as unpatentable over Csonger in view of Barr '866 and the rejection of claim 12 over Csonger in view of Barr '866 and further in view of Barr '989.

The present invention, as defined in parent claim 10, is directed to a mixing device which comprises a shaft, a front ring, an end ring and a mixing ring. The mixing ring is loose fitting and is rotatable and can also be moved back and forth between the front ring and the end ring. The mixing ring includes a first region, dimensioned to overlap the smaller diameter portion of the front ring and a third region dimensioned to overlap the smaller diameter of the end ring with a second region between the first and third regions. The mixing ring is sufficiently long so that when one of the end regions (first region or third region) overlaps one of the rings the other of the end regions partially overlaps the other ring. As defined in claim 10 the mixing ring, in its second region, includes at least two channels which run axially parallel and are arranged offset in relation to each other. The mixing ring further comprises spaced baffles arranged at the at least two channels.

By the arrangement defined in parent claim 10 the mixing ring channels, which might also be channel segments, are arranged in offset relation to each other and the mixing ring also includes spaced baffles in these, at least, two channels. As a result, by way of example when referring to Figure 6 of this application the baffles produced between the channels or channel segments are such that the linear flow of moving fluid is interrupted. The baffle areas are designated in Figure 6 as 4p. Page 7, lines 35-41 of the original Specification (page 8, lines 37-46 of the substitute Specification) points out that "at least two of the channels (4k) run axially parallel (axially) and are offset in relation to each other...in such a way that baffle areas are produced between them." Page 10, lines 1-6 of the original Specification (page 11, lines 7-12 of the substitute Specification) in discussing the operation of the mixing device in the condition shown in Figure 6 points out that when the mixing device is against the front ring the melt streams are divided directly into volume elements by openings in the mixing ring. "The melt streams then impinge, for example, upon baffles (4p) of the mixing ring, which are produced by the channels 4k of the mixing ring being arranged offset in relation to one another." As a result of this baffle arrangement the material streams would collide with or crash into or bounce against the barriers in the baffle areas. As a consequence, turbulences in the flow of material are generated thus aiding an effective mixing of the material.

It is respectfully submitted that, as discussed in the interview, Csonger does not disclose the type of mixing device and in particular the mixing ring in that device as defined in claim 10. Csonger relates to a modular mixing apparatus which combines a plurality of rotating shear ring means with a stationary sleeve element by means of laminar displacement of a fluid is achieved, then dispersed material is separated into spaced apart stream material, and the spaced apart streams are further subdivided (col. 1, lines 43-49). In particular, the mixing apparatus of Csonger includes (1) a main shaft which is engaged with a threaded end of an extruder screw and rotatable therewith, (2) spaced apart shear ring elements rotatable with the shaft, and (3) a stationary shearing control sleeve which is located between the shear ring elements, disposed around the driver shaft, and fixed to an outer extruder barrel component of the apparatus (col. 2, lines 65 to col. 3, line 4).

Thus Csonger does not disclose a mixing ring in the sense of the present invention. As recognized by Examiner Cooling in the Office Action the shearing control sleeve of Csgoner is stationary. It is not a loose mixing ring which is freely rotatable and can be moved back and forth between a front ring and an and ring. In Csonger the stationary control sleeve which is fixed to the outer extruder barrel component has the purpose of guiding the moving fluid body along undulated linear paths of travel of relatively short axial length (col. 3, lines 7-13), after and before the fluid is displaced in a laminar way by shear ring means. The stationary sleeve would cause the fluid to move in a laminar way, i.e., without intimate mixing of the moving body fluid within the stationary shearing control sleeve and would not provide mixing by causing turbulences in the manner illustrated in Figure 6 and defined in claim 10 of this application.

Furthermore, the stationary shearing control sleeve of Csonger has an inner peripheral surface that is further constructed with spaced apart axially extending grooves of conical shape as shown in Figures 4 and 9. The material is guided along a plurality of linear paths of travel between the sleeve and shaft (col. 4, lines 26-34). The grooves are not offset in relation to each other in the sense of the current application and therefore no baffle areas are created as defined in claim 10.

Barr '866 was relied upon for the teaching of a mixing device having a loosely mounted mixing ring. Barr '866 outlines the flow that occurs through the mixing apparatus in Figure 3 and its description at col. 4, lines 31-42. Each annular row of outflow circular apertures 36 is connected at its upper end with the upstream (left) end of the outer sleeve flow channel 38 as shown in Figure 3. Similarly, the upper end of each inflow circular apertures 36' is connected to the right (downstream) end of the outer sleeve flow channel and has its lower end connected to the upstream end of the next adjacent rotor flow transfer cavity 22. Thus, the paired apertures 36,36' of each annular row of such apertures are positioned to communicate with the opposite ends of two adjacent elongated rotor flow transfer cavities which are separated by a rotor ring 28. Although Barr '866 indicates that the floating sleeve can move from the position of Fig. 1A to the position of Fig. 1B thereby closing and opening the annular channel 44 according to Fig. 1A, there is no disclosure concerning an "end ring". In particular, there is no disclosure regarding the length of the floating sleeve to be such that when one end region of the floating sleeve overlaps one ring, the other end region of the sleeve would overlap the other ring as defined in claim 10. Further, there is no disclosure of incorporating in Barr any structure that would comprise spaced baffle areas in at least two channels of a mixing ring as defined in claim 10.

In addition, it is submitted that there would be no motivation to one of ordinary skill in the art having knowledge of the Csonger and Barr '866 patents to modify the Csonger arrangement by using a floating sleeve in place of the stationary shearing control sleeve of Csonger. In that regard, Csonger at col. 4, lines 35-39 refers to the "stationary" sleeve as being an important feature of the invention. Accordingly, it would be contrary to the teachings and intent of Csonger to provide a sleeve which is not stationary. In any event, even if the floating sleeve of Barr '866 were substituted for the stationary sleeve of Csonger the hypothetical combination would still lack a mixing ring having at least two channels with baffle areas arranged in the at least two channels and the hypothetical combination would lack a mixing ring having end regions which would remain in overlapping relationship with a front ring and an end ring even when the mixing ring is moved back and forth between the front ring and the end ring.

During the interview Examiner Cooley referred to Renk U.S. 4,128,342 which in Figure 6 illustrates groove rings 14,18. Ring 18 has grooves 35 that appear to terminate at an annular rim. Such rim would not be spaced baffles in the manner of claim 10, apart from other differences between Renk and claim 10.

Claim 17 has been added to define an injection molding device which includes at least one mixing device as claimed in claim 10. Support for claim 17 is found, for example, at page 8, lines 36-39 of the original Specification (page 10, lines 35-38 of substitute Specification).

Claim 18 has been added to define spaced baffles at all of the mixing ring channels. Support for claim 18 is found at page 7, lines 36-41 of the original Specification (page 8, line 42 to page 9, line 1 of substitute Specification). That portion of the Specification provides the support in parent claim 10 wherein at least two of the channels include the baffle areas and also provides the support for claim 18 regarding a preferred practice of the invention would be "for all the channels (4k) to run axially and to be offset in relation to one another in such a way that baffle areas are produced between them."

In view of the above remarks and amendments it is submitted that this application should be passed to issue.

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Respectfully submitted,

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